AMENDMENTS TO THE CLAIMS

Please amend Claims 1, 46, 50, and 52.

Please cancel Claims 2 and 53 without prejudice.

A complete listing of all claims is presented below with insertions underlined (e.g., insertion), and deletions struckthrough or in double brackets (e.g., ~~deletion~~ or [[deletion]]):

1. (Currently Amended) A method of fabricating a halogen-doped glass, the method comprising:

preparing a first substance comprising metal alkoxide;

preparing a second substance comprising a catalyst;

providing a halogen-comprising chemical;

forming a solution comprising the halogen by mixing the first substance and the second substance together with the halogen-comprising chemical;

cooling the solution to a mixture temperature which is approximately equal to or less than -25 °C, wherein the solution has a significantly longer gelation time at the mixture temperature as compared to a room temperature gelation time for the solution;

allowing the solution to gel, thereby forming a wet gel monolith; and

drying the wet gel monolith to provide ~~providing~~ a gel monolith having a first halogen content;

reducing an impurity concentration of the gel monolith; and

consolidating the gel monolith into a glass having a second halogen content, the second halogen content being less than or equal to the first halogen content.

2. (Canceled)

3. (Original) The method of Claim 1, wherein reducing the impurity concentration comprises reducing a hydroxyl impurity concentration of the gel monolith by heating the gel monolith at a first elevated temperature while the gel monolith is exposed to a first atmosphere having a chlorine (Cl_2) concentration.

4. (Original) The method of Claim 3, wherein the first elevated temperature is between approximately 400 degrees Celsius and approximately 1000 degrees Celsius.

5. (Original) The method of Claim 3, wherein the first elevated temperature is between approximately 400 degrees Celsius and approximately 700 degrees Celsius.

6. (Original) The method of Claim 3, wherein the first elevated temperature is ramped.

7. (Original) The method of Claim 3, wherein the first atmosphere has a pressure less than atmospheric pressure.

8. (Original) The method of Claim 7, wherein the chlorine concentration is between approximately 3% and approximately 20%.

9. (Original) The method of Claim 7, wherein the chlorine concentration is approximately 10%.

10. (Original) The method of Claim 3, wherein reducing the impurity concentration further comprises reducing a chlorine impurity concentration of the gel monolith.

11. (Original) The method of Claim 10, wherein reducing the chlorine impurity concentration of the gel monolith comprises heating the gel monolith at a second elevated temperature while the gel monolith is exposed to a second atmosphere having an oxygen (O_2) concentration.

12. (Original) The method of Claim 11, wherein the second elevated temperature is between approximately 700 degrees Celsius and approximately 950 degrees Celsius.

13. (Original) The method of Claim 11, wherein the second elevated temperature is ramped.

14. (Original) The method of Claim 11, wherein the second atmosphere has a pressure less than atmospheric pressure.

15. (Original) The method of Claim 14, wherein the oxygen concentration is between approximately 30% and approximately 100%.

16. (Original) The method of Claim 14, wherein the oxygen concentration is approximately 50%.

17. (Original) The method of Claim 1, wherein the gel monolith comprises pores with an average pore diameter between approximately 10 nanometers and approximately 100 nanometers.

18. (Original) The method of Claim 1, wherein the gel monolith comprises pores with an average surface area between approximately 80 square meters per gram and approximately 700 square meters per gram.

19. (Original) The method of Claim 1, wherein the halogen comprises iodine.

20. (Original) The method of Claim 1, wherein the halogen comprises bromine.

21. (Original) The method of Claim 1, wherein the halogen comprises fluorine.

22. (Original) The method of Claim 21, wherein the first halogen content of the gel monolith comprises between approximately 0.1% fluorine and approximately 10% fluorine.

23. (Original) The method of Claim 21, wherein the first halogen content of the gel monolith comprises between approximately 3% fluorine and approximately 8% fluorine.

24. (Original) The method of Claim 21, wherein the second halogen content of the glass comprises between approximately 0.5 wt. % fluorine and approximately 4 wt. % fluorine.

25. (Original) The method of Claim 21, wherein the second halogen content of the glass comprises between approximately 0.5 wt. % fluorine and approximately 2.5 wt. % fluorine.

26. (Original) The method of Claim 1, wherein the halogen comprises fluorine and consolidating the gel monolith comprises ramping the temperature of the gel monolith at a ramp rate such that the second halogen content of the glass is at least approximately 0.5 wt. % fluorine.

27. (Original) The method of Claim 26, wherein the ramp rate is between approximately 10 degrees Celsius per hour and approximately 150 degrees Celsius per hour.

28. (Original) The method of Claim 1, wherein the halogen comprises fluorine and consolidating the gel monolith comprises heating the gel monolith to an elevated temperature while being exposed to an atmosphere comprising a fluorine-containing gas concentration.

29. (Original) The method of Claim 28, wherein the fluorine-containing gas comprises one or more of the following gases: SiF_4, $SiHF_3$, SiH_2F_2, SiH_3F, CF_4, CHF_3, CH_2F_2, CH_3F, C_2F_6, C_2HF_5, $C_2H_2F_4$, $C_2H_3F_3$, $C_2H_4F_2$, C_2H_5F, SF_6, SHF_5, SH_2F_4, SH_3F_3, SH_4F_2, SH_5F, HF, and F_2.

30. (Original) The method of Claim 28, wherein the atmosphere has a pressure less than atmospheric pressure.

31. (Original) The method of Claim 30, wherein the fluorine-containing gas concentration is between approximately 10% and approximately 80%.

32. (Original) The method of Claim 30, wherein the fluorine-containing gas concentration is between approximately 20% and approximately 50%.

33. (Original) The method of Claim 30, wherein the fluorine-containing gas concentration is sufficient to reduce liberation of fluorine from the gel monolith during consolidation.

34. (Original) The method of Claim 28, wherein the elevated temperature is between approximately 800 degrees Celsius and approximately 1250 degrees Celsius.

35. (Original) The method of Claim 28, wherein the elevated temperature is between approximately 950 degrees Celsius and approximately 1100 degrees Celsius.

36. (Original) The method of Claim 28, wherein the elevated temperature is ramped.

37. (Original) The method of Claim 1, wherein the glass has an internal transmission at 157 nanometers of at least approximately 80% through 6.35 millimeters of glass.

38. (Original) The method of Claim 1, wherein the glass has an internal transmission at 157 nanometers of at least approximately 85% through 6.35 millimeters of glass.

39. (Original) The method of Claim 1, wherein the glass has an internal transmission at 157 nanometers of at least approximately 89% through 6.35 millimeters of glass.

40. (Original) The method of Claim 1, wherein the glass has an index of refraction difference from undoped silica glass of between approximately 0.001 and approximately 0.012.

41. (Original) The method of Claim 1, wherein the glass has an index of refraction difference from undoped silica glass of between approximately 0.002 and approximately 0.010.

42. (Original) The method of Claim 1, wherein the glass has an OH content below approximately one part per million.

43. (Original) The method of Claim 1, wherein the glass has a refractive index inhomogeneity for nonpolarized light below approximately 100 parts per million.

44. (Original) The method of Claim 1, wherein the glass has a refractive index inhomogeneity for polarized light below approximately 10 parts per million.

45. (Original) The method of Claim 1, wherein the glass has a coefficient of thermal expansion of approximately 5×10^{-7} per degree Celsius.

46. (Currently Amended) A method of forming a halogen-doped glass, the method comprising:

<u>preparing a first substance comprising metal alkoxide;</u>

<u>preparing a second substance comprising a catalyst;</u>

providing a halogen-comprising chemical;

forming a solution comprising the halogen by mixing the first substance and the second substance together with the halogen-comprising chemical;

cooling the solution to a mixture temperature which is approximately equal to or less than -25 °C, wherein the solution has a significantly longer gelation time at the mixture temperature as compared to a room temperature gelation time for the solution;

allowing the solution to gel, thereby forming a wet gel monolith; and

drying the wet gel monolith to provide ~~providing~~ a gel monolith having a first halogen content;

reducing an impurity concentration of the gel monolith; and

heating the gel monolith to an elevated temperature sufficient to sinter the gel monolith into a glass having a second halogen content less than or equal to the first halogen content.

47. (Original) The method of Claim 46, wherein heating the gel monolith comprises ramping the temperature of the gel monolith at a ramp rate such that the second halogen content is above a preselected value.

48. (Original) The method of Claim 47, wherein heating the gel monolith further comprises exposing the gel monolith to an atmosphere comprising a halogen-containing gas

49. (Original) The method of Claim 46, wherein reducing the impurity concentration of the gel monolith comprises:

reducing a hydroxyl impurity concentration of the gel monolith by heating the gel monolith at a first elevated temperature while the gel monolith is exposed to a first atmosphere having a chlorine (Cl_2) concentration; and

reducing a chlorine impurity concentration of the gel monolith by heating the gel monolith at a second elevated temperature while the gel monolith is exposed to a second atmosphere having an oxygen (O_2) concentration.

50. (Currently Amended) A method of fabricating a halogen-doped glass, the method comprising:

preparing a first substance comprising metal alkoxide;

preparing a second substance comprising a catalyst;

providing a halogen-comprising chemical;

forming a solution comprising the halogen by mixing the first substance and the second substance together with the halogen-comprising chemical;

cooling the solution to a mixture temperature which is approximately equal to or less than -25 °C, wherein the solution has a significantly longer gelation time at the mixture temperature as compared to a room temperature gelation time for the solution;

allowing the solution to gel, thereby forming a wet gel monolith; and

drying the wet gel monolith to provide a gel monolith having a halogen content;

consolidating ~~a~~the gel monolith having a halogen content; and

reducing the liberation of halogen from the gel monolith during the consolidation by exposing the gel monolith to a halogen-containing gas during the consolidation.

51. (Original) The method of Claim 50, wherein the halogen comprises fluorine.

52. (Currently Amended) A method of fabricating a fluorine-doped silica glass, the method comprising:

preparing a first substance comprising metal alkoxide;

preparing a second substance comprising a catalyst;

providing a fluorine-comprising chemical;

forming a solution comprising the halogen by mixing the first substance and the second substance together with the fluorine-comprising chemical;

cooling the solution to a mixture temperature which is approximately equal to or less than -25 °C, wherein the solution has a significantly longer gelation time at the mixture temperature as compared to a room temperature gelation time for the solution;

allowing the solution to gel, thereby forming a wet gel monolith; and

drying the wet gel monolith to provide a gel monolith having a fluorine content;

consolidating ~~a~~the gel monolith having a fluorine content in an environment with an elevated fluorine partial pressure.

53. (Canceled).